

## Warm-Up 2

# EPA's Superfund Program: Overview



Duration	1 class period
Grade Level	7-12
Key Terms/ Concepts	Early Action Emergency Response Cleanup Hazardous Waste Long-term Action Potentially Responsible Party Superfund
Suggested Subjects	Civics/Government Life Science Physical Science Social Studies

## Purpose

Students become familiar with the goals of the Superfund Program, and the means by which those goals are achieved. The principal goal of the Superfund Program is to reduce and eliminate threats to human health and the environment posed by closed or abandoned hazardous waste sites. Students become familiar with the different ways the U.S. Environmental Protection Agency (EPA) responds to threats posed by hazardous waste, how hazardous waste sites are characterized and cleaned up, and the role of the local community in the process.

## Background

**Hazardous waste** comes from a variety of sources, from both present and past activities. Years ago, before we understood the dangers of hazardous waste, there were no laws controlling its disposal. Many businesses and industries treated their hazardous waste the same as the rest of their trash—so it ended up in a landfill, dumped in a river or lake, or buried in the ground.

Eventually, thousands of uncontrolled or abandoned hazardous waste sites were created in abandoned warehouses, manufacturing facilities, harbors, processing plants, or landfills. The **Superfund** Program was created in 1980 to investigate and clean up hazardous waste sites nationwide.

*Fact Flash 2: The Superfund Cleanup Program* provides a good overview of what EPA is trying to accomplish with the Superfund Program. Superfund is a nickname for the law that requires EPA to take care of hazardous waste sites, and gives them legal power to force the people who created the sites to clean them up or repay the government for its cleanup efforts. The nickname comes from a trust fund that provides money for investigating and cleaning up these sites.



The Superfund Program refers to the work EPA does to clean up abandoned hazardous waste sites. The Superfund Program also responds to emergencies such as a fire in a chemical plant where poisonous gas might be released, or a highway accident involving a tractor-trailer that is carrying hazardous material. In these situations, as always, EPA's first responsibility is to protect the health and safety of the people, plants, animals, and waterways in the area from immediate danger.

For more information on the Superfund program, see the Suggested Reading list found at the end of the Haz-Ed materials. Other Haz-Ed materials that are related to this topic include *Warm-Up 6: What is an Aquifer?* and *Activity 2: Examining a Hazardous Waste Site*.

## Preparation

### Option 1: Video and Discussion/Review

1. Gather the following materials:
  - VCR and monitor
  - EPA videotape *This is Superfund* (available from NTIS; information on ordering is given at the end of this document)
  - Copies for each student of the Student Worksheet, *Understanding Superfund: A Quiz To Test Your Knowledge*, and the brochure, *This Is Superfund* (found at the end of the Haz-Ed materials).
2. Read *Fact Flash 2: The Superfund Cleanup Program* to prepare for discussion.

### Option 2: Lecture and Demonstration

1. Gather the following materials:
  - 3 clear glass or plastic cups (9 oz. each)
  - red food coloring
  - vegetable oil
  - maple syrup
  - copies for each student of the Student Worksheet, *Understanding Superfund: A Quiz to Test Your Knowledge*, and the brochure, *This is Superfund*.
2. Read *Fact Flash 2: The Superfund Cleanup Program* to prepare your lecture. Read *Activity 2: Examining a Hazardous Waste Site* for information on the way different contaminants behave in an aquifer.



## Procedure

### Option 1: Video and Discussion/Review

1. Distribute the Student Worksheet, *Understanding Superfund: A Quiz To Test Your Knowledge*, and instruct the class to read and complete the quiz. Allow 4 or 5 minutes for the completion of the quiz.
2. Outline the activities comprising this exercise:
  - The quiz will be reviewed and some answers discussed.
  - A videotape entitled *This is Superfund* will be shown (if available).
  - A brief lecture on the Superfund Program will be presented.
  - Correct answers to the quiz will be provided.
  - A discussion of the program and a question-and-answer session will end the class.
3. Review the quiz. Ask volunteers to provide their answers, but do not provide the correct answers (which will come later). Ask the class if anyone knows of any Superfund sites. Have they ever wondered how Superfund sites are discovered? Do they know how the risks at the site are assessed? Do they know how sites are cleaned up? Who is responsible for performing these tasks and why?
4. If students volunteer some familiarity with the program or a site, have them share their knowledge with the class. The site may be local, or it may be one of the better known sites across the country. If appropriate, locate a nearby site for the class and briefly describe the situation. (NOTE: Information on individual sites is available from EPA's Regional Office for your state. A list of EPA's Superfund Community Involvement Offices for each Region is found in the materials at the end of this document.)
5. Show the videotape *This is Superfund*. If you are unable to show the video, use the information in Fact Flash 2 and the brochure, *This is Superfund*, to explain the program to the students.
6. Discuss the video, restating some of the highlights of the presentation. (NOTE: If you are not familiar with the program, you may want to view the video or read through the brochure *This is Superfund* prior to the classroom discussion of the program.)
7. Review the answers to the quiz in light of the video. (See *Instructor's Answer Key*, attached.) Distribute the brochure, *This is Superfund*.



8. Discuss the assessment process by which sites are discovered and risks are determined. Note that sites can be discovered by anyone, and that there is a hotline for reporting potential sites.
9. Discuss the site cleanup process and the importance of the potentially responsible parties. The class should understand that Superfund is not a “public works” program under which the government takes responsibility for the cleanup of sites. Rather, the government attempts to identify PRPs and encourages them to undertake the cleanups. If the parties are unwilling to undertake the cleanup, the government may compel the parties to do so by court order, or may elect to perform the cleanup and recover costs from the responsible parties.
10. The discussion session should be interactive; ask the class questions as well as answer them. Types of questions for the class to consider include a discussion of why there are uncontrolled hazardous waste sites, why the government looks for PRPs rather than performing cleanups, why some cleanups take a long time, and the consequences for the public if there were no Superfund Program.
11. Assign *Fact Flash 2: The Superfund Cleanup Program* for homework.

### Option 2: Lecture and Demonstration

1. Distribute the Student Worksheet, *Understanding Superfund: A Quiz to Test Your Knowledge*, and instruct the class to read and complete the quiz. Allow 4 or 5 minutes for the completion of the quiz.
2. Outline the activities comprising this exercise:
  - The quiz will be reviewed and some answers discussed
  - A brief lecture on the Superfund Program will be presented
  - Correct answers to the quiz will be provided
  - A demonstration of the behavior of different contaminants in water will be presented.
3. Review the quiz. Ask volunteers to provide their answers, but do not provide the correct answers (which will come later). Ask the class if anyone knows of any Superfund sites. Have they ever wondered how Superfund sites are discovered? Do they know how the risks at the site are assessed? Do they know how sites are cleaned up? Who is responsible for performing these tasks and why?
4. If students volunteer some familiarity with the program or a site, have them share their knowledge with the class. The site may be local, or it may be one of the better known sites across the country. If appropriate, locate a nearby site for the class and briefly describe the situation. (NOTE: *Information on individual sites is*



available from EPA's Regional Office for your state. A list of EPA's Superfund Community Involvement Offices for each Region is found in the materials at the end of this document.)

5. Perform the demonstration.
  - a. Fill each of the 3 cups with water.
  - b. Discuss how different types of wastes call for different types of action or cleanup methods.
  - c. Add a drop of red food coloring into the first cup. What happens? How would you clean this up? The red food coloring simulates the behavior of gasoline or other water-soluble contaminant in water.
  - d. Add a drop of vegetable oil to the water in the second cup. What happens? How would you clean this up? The vegetable oil simulates the behavior of a light non-aqueous phase liquid (LNAPL), such as jet fuel. LNAPLs are lighter than water but do not mix with water.
  - e. Add a drop of maple syrup to the water in the third cup. What happens? How would you clean this up? The maple syrup simulates the behavior of a dense non-aqueous phase liquid (DNAPL), such as TCE. DNAPLs are heavier than water but do not mix with water.
  - f. These demonstrations illustrate some of the contaminants found at a Superfund site. *Warm-Up 6: What is an Aquifer?* and *Activity 2: Examining a Hazardous Waste Site* examine the behavior of pollutants in groundwater in greater detail.
6. Review the answers to the quiz in light of the lecture. (See Instructor's Answer Key, attached.) Distribute copies of the brochure, *This is Superfund*, to the students.
7. Discuss the assessment process by which sites are discovered and risks are determined. Note that sites can be discovered by anyone, and that there is a hotline for reporting potential sites.
8. Discuss the site cleanup process and the importance of the potentially responsible parties. The class should understand that Superfund is not a "public works" program under which the government takes responsibility for the cleanup of sites. Rather, the government attempts to identify PRPs and encourages them to undertake the cleanups. If the parties are unwilling to undertake the cleanup, the government may compel the parties to do so by court order, or may elect to perform the cleanup and recover costs from the responsible parties.



9. The discussion session should be interactive; ask the class questions as well as answer them. Types of questions for the class to consider include a discussion of why there are uncontrolled hazardous waste sites, why the government looks for PRPs rather than performing cleanups, why some cleanups take a long time, and the consequences for the public if there were no Superfund Program.
10. Assign *Fact Flash 2: The Superfund Cleanup Program* for homework.

## Extensions (Optional)

Break the class into groups and make assignments for presentations during a follow-up class. The number of groups may vary, but each should include about 5 or 6 students. Give them a week or more to complete the research and prepare their reports.

Encourage group members to discuss among themselves how best to accomplish the research required, make contact with appropriate sources of information, conduct interviews, compile information, structure the presentation, and prepare to answer questions posed by other students. Below are some topics and recommended resources the students could use.

1. **Local Emergency Response** — This group should report on how chemical spills and other hazardous substances emergencies are handled in this community. While the EPA has the power and ability to respond to emergencies, typically the first response will be from the local fire department or other emergency management team. Students should report on the roles different local, state, and Federal agencies play in responding to emergencies. Does one group assess the extent of damage and another clean up hazards? How do the agencies interact and coordinate their efforts?
2. **Local or State Superfund Site** — By contacting the EPA Regional Community Involvement Coordinator (CIC) for your state (see the *This is Superfund* brochure), students can choose a nearby Superfund site or a site within the state for research. Information can be collected from the Regional CIC or from a nearby Superfund Information Repository. A Superfund Information Repository is a place near each Superfund site where information about the site is kept for public review. Typically, these repositories are at public libraries. This group should make a presentation on the information available for that site. The report could include:
  - The contaminants found at the site
  - The contaminated media (soil, rivers, lakes, groundwater, or air)
  - Whether any responsible parties have been identified
  - Who is paying for the cleanup
  - Any technologies that are being used to treat the contamination
  - Any other pertinent information.



The content of the report will depend on how far along the site is in the Superfund process. Sites where cleanup action is already underway would be the most interesting. Note that information on more than one site can be presented; each group can make a presentation on a different site. This will emphasize the different types of hazardous waste sites cleaned up under the Superfund Program. If you live in an area with a significant number of sites, you may consider having each group make a presentation on a different local site.

When each group gives its presentation, allow other students to ask questions. Ask group members what problems, if any, they encountered in preparing their presentations. Ask if they uncovered information or met people who were particularly surprising or interesting.

## Instructor's Answer Key

### Warm-Up 1: Understanding Superfund — A quiz to test your knowledge

1. **What is Superfund?**
  - a. A Federal program that cleans up the nation's worst hazardous waste sites.
  - d. A fund of money made up of Federal tax revenues used to pay for hazardous waste site cleanups.
2. **What is meant by the term "hazardous waste?"**
  - a. By-products of society that can pose a substantial or potential threat to human health or the environment when improperly managed.
  - c. A waste product with one or more of the following characteristics: ignitable (it can catch fire easily), corrosive (it can eat away material), reactive (it causes a violent or harmful reaction), or toxic (it is poisonous).
3. **Who is responsible for cleaning up hazardous waste sites?**
  - a. The U.S. Environmental Protection Agency.
  - b. State and local environmental agencies.
  - c. The U.S. Coast Guard.
  - d. Organizations and people responsible for contamination at the sites.



**4. Who pays for the sites to be cleaned up?**

- a. Organizations and people responsible for contamination at the sites.
- b. EPA through the Superfund trust fund, if responsible parties cannot be identified or cannot perform the cleanup.
- d. Federal agencies, such as the U.S. Department of Energy, that are responsible for site contamination.





# Understanding Superfund: A quiz to test your knowledge

Circle every answer to a question that you think is a correct response.

**1. What is Superfund?**

- a. A Federal program that is in charge of all environmental laws of the United States.
- b. A Federal program that cleans up the nation's worst hazardous waste sites.
- c. A collection of all Federal and state laws that regulate hazardous materials.
- d. A fund made up of Federal tax revenues used to pay for hazardous waste site cleanups.

**2. What is meant by the term "hazardous waste?"**

- a. By-products of society that can pose a substantial or potential threat to human health or the environment when improperly managed.
- b. Mercury in a thermometer.
- c. A waste product with one or more of the following characteristics: ignitable (it can catch fire easily), corrosive (it can eat away material), reactive (it reacts violently or harmfully), or toxic (it is poisonous).
- d. What you had for dinner last night.

**3. Who is responsible for cleaning up hazardous waste sites?**

- a. The U.S. Environmental Protection Agency.
- b. State and local environmental agencies.
- c. The U.S. Coast Guard.
- d. Organizations and people responsible for contamination at the sites.

**4. Who pays for the sites to be cleaned up?**

- a. Organizations and people responsible for contamination at the sites.
- b. EPA through the Superfund trust fund, if responsible parties cannot be identified or cannot perform the cleanup.
- c. The public through a sales tax.
- d. Federal agencies, such as the U.S. Department of Energy, that are responsible for site contamination.

